## ROADWAY INCIDENT MANAGEMANT AND SAFETY

## STRATEGIC MANAGEMENT OF CHANGE

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#### **ABSTRACT**

Several firefighters and Emergency Medical Service (EMS) workers are killed and many are injured each year by vehicles striking them while performing emergency functions at roadway incidents. The main problem is that in some departments, formal training and procedures do not exist for establishing warning devices and managing vehicle traffic as it approaches the incident scene.

The purpose of this research is to review literature available on roadway safety, survey fire departments for current procedures, and develop a training lesson plan. This research project used both evaluative and action research to answer the following questions: Is there a universal way to establish a roadway incident scene? What safety procedures by members must be reinforced? What are the guidelines for setting out cones and flares? What other warning devices are being used by fire departments?

The procedures to collect data included a literature review and a survey instrument.

The survey was used to determine if the departments were (1) following a written

Standard Operating Procedure (SOP) or had developed lesson plans on roadway safety,

(2) what type of training was conducted, and (3) what types of warning devices are used.

The results of the research produced a method to develop a Traffic Control Zone, that may be used on any type roadway incident and safe crew activities that should be reinforced with training and exercises. The recommendations are that all fire service organizations should develop a training lesson on roadway safety and establish a SOP. Departments that do not have enhanced warning devices or equipment such as reflective florescent vests, lighted arrow boards vests, light-wand flashlights, or apparatus reflective stripping should evaluate this equipment for inclusion in their apparatus inventory.

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#### INTRODUCTION

All fire departments have a duty to protect their employees and the public which includes minimizing the potential risk to employees in such high hazard situations as firefighting and pre-hospital emergency medical services. Significant training occurs in every fire department to address these primary elements of the job. A treacherous aspect of the job is that quite often these functions are carried out on roads and highways. Several firefighters and Emergency Medical Service (EMS) workers are killed and many more are injured each year by vehicles striking them while performing emergency functions at roadway incidents.

The main problem is that in some departments, formal training and procedures do not exist for establishing warning devices and managing vehicle traffic as it approaches the incident scene. In the Dallas Fire Department, training does occur in the recruit academy and at the station level using sources such as NFPA 1500 or fire service texts which devote sections to controlling highway incident scenes, but this training is not standardized throughout the department. The purpose of this research is to review literature available on roadway safety, survey fire departments for current procedures, and develop a training lesson that will be delivered to all members of the department. This training will be conducted at the department's training facility where each company will receive classroom training and complete an exercise establishing safe incident scenes for various roadways. In addition, standardization of current equipment and the addition of new equipment will be evaluated for inclusion into apparatus inventory.

The methodology used included a literature review of relevant materials from the National Fire Academy's (NFA) Learning Resource Center (LRC) and the text and video

library at the Dallas Fire Department Training Division. This research project used evaluative and action research to prepare a Roadway Safety Training Lesson for the department and answer the following research questions:

- 1. Is there a universal way to establish a roadway incident scene that may be used for all types of incidents and roadways?
- 2. What safety procedures used by members must be reinforced with training so they become institutionalized?
- 3. What are the best methods or guidelines for setting out cones and flares at a roadway incident?
- 4. What equipment or warning devices are being used by fire departments other than cones and flares at roadway incidents?

#### **BACKGROUND AND SIGNIFICANCE**

Members of the Dallas Fire Department are solicited each year for input into the subjects selected for the two annual In-Service Training Phases that are taught at the Department's training facility. The classes and/or exercises are attended department-wide in groups of five or six companies taught by the Training Division instructors and selected Operation's personnel. In a recent In-Service Training Survey, members of the department indicated they considered working an emergency incident on a freeway as dangerous as structural firefighting. Significant interest was displayed to have a formal Roadway Safety Training Lesson delivered as a training phase.

In the Dallas Fire Department, 25% of incidents involving fire companies and 20% of incidents involving EMS units are due to roadway incidents; these primarily being

vehicle accidents with injuries or vehicle fires. Our Defensive Driving Course teaches us about vision and hearing-impaired drivers, fatigued and drug impaired drivers, and stressed-out and inattentive drivers. The members of the department need to prepare for unexpected actions by these drivers and all members receive adequate training to the same level of preparedness.

In the Strategic Management of Change course at the National Fire Academy, Module 3 discussed the necessity to move from the reactionary paradigm of change to developing proactive change by anticipating and developing a willingness to move from the established paradigm. Realizing that working at roadway incidents is one of the most dangerous functions in the profession, this applied research paper was developed anticipating the seriousness of the consequences for not establishing a Roadway Safety Training Lesson and not waiting for a significant event to drive the process. A primary function of leadership in the fire service is to take action whenever appropriate.

#### LITERATURE REVIEW

Overall scene safety begins with the Incident Commander beginning a preliminary survey of the vehicles before leaving the apparatus. The survey should include traffic control, hazard control, crowd control and other agency control. To control the traffic entering the area, a Traffic Control Sector should be established and the Incident Commander should determine the method of re-routing or if completely blocking all the lanes of traffic is necessary. Rip, Czajkowski, and Hoskins (1986) also state that a minimum number of rescue personnel should be assigned to traffic control and this function should be turned over to law enforcement as soon as possible.

In his article "Highway Incident Scene Safety," Adams (1992) states that traffic control is the key consideration at every call if you do not want to have a roadside tragedy involving EMS and fire personnel. "There are basically two approaches; setting up barriers at the scene and safe crew activities" (Adams, p. 14). The article states that Firehouse Magazine surveyed emergency responders around the U.S. and some departments suggest using the apparatus as a barrier. This may be accomplished by positioning one unit to shield the accident scene and responders from traffic. The magazine also contacted traffic engineers that said, "The key issues to scene protection are long range visibility and warning, obvious options, adequate decision time and a wellmanaged flow control" (Adams, p. 14). The officer or Incident Commander should assess the situation, decide what traffic should do and provide a safe, clearly defined way to do it. Confused drivers are unsafe drivers and may be the most deadly at a highway incident. It is essential that every member of the team know how to safely operate at the scene and this may be accomplished through awareness, training and discipline in any onroad call.

Dunn (1992) states the greatest danger to firefighters and paramedics at the scene of a vehicle fire or accident on a highway is not from leaking gasoline or flames. Oncoming vehicles are the most significant threat to their safety because each year emergency personnel are killed and injured during highway operations because of them. In *Safety and Survival on the Fireground*, he suggests that when a fire company arrives on the scene of a highway emergency and there are no police at hand to control the oncoming traffic, firefighters themselves must control the oncoming traffic before turning their attention to the emergency. Dunn states:

A firefighter directed to stop highway traffic must never turn his back on oncoming vehicles, nor should he believe that the oncoming vehicles will stop for red warning lights, flashlights, or flags, or just because he's dressed in firefighting clothing. He must always face oncoming traffic and be prepared to jump out of the way at a moment's notice (Dunn, p. 44).

The idea is also developed that three factors determine the total stopping distance of a vehicle and all three must be considered when determining the distance to place warning devices from a highway incident. These factors are:

- 1. Perception time: The time it requires for the driver to realize a danger exists on the roadway. This time is estimated at ¾ of a second.
- 2. Reaction time: The time needed by a driver to move a foot from the gas pedal to the brake pedal. This interval is also estimated at ¾ of a second.
- Braking distance: The distance a vehicle will move after braking. (Dunn, 1992, p. 44)

With these factors in mind, Dunn states that warning devices on a highway should be placed at least 350 feet from the fire apparatus and positioned so that it is visible to an oncoming motorist at least 350 feet before that. This placement will give the driver 700 feet to stop a vehicle once he perceives the danger. Vehicles traveling 60 miles per hour should be able to stop prior to the beginning of the warning devices. The additional 350 feet between the warning device and the apparatus will provide a safe distance within which to operate. It will also provide a safety factor against vehicles with defective brakes or against motorists who are driving while impaired and cannot see the emergency scene.

Traffic flow, which is a high priority item with responding police personnel, should have no impact on the apparatus operator or placement of a fire apparatus. In "Take the Lane: Apparatus Positioning at Motor Vehicle Accidents," the article recommends positioning the apparatus to create an extended work area. It should be positioned to take the lane of the incident and the adjacent lane to extend the safe zone. When rescuers are performing fire suppression, extrication or patient packaging, the potential for being struck by oncoming traffic should be the least of their worries. Reviewing current operating procedures on apparatus positioning will ensure that personnel safety will not be left to chance.

The International Fire Service Training Association (IFSTA), a nonprofit educational association organized to develop training materials for the fire service, addresses the issue of firefighter safety at highway accidents in *Fire Department Occupational Safety*. The chapter "En Route Hazards and Response" briefly covers apparatus placement and states that it should be placed between the flow of traffic and the firefighters working on the incident to act as a shield. It recommends the apparatus be placed at an angle so that the operator is protected from the traffic by the tailboard. It also states to turn the front wheels away from firefighters so the apparatus will not be driven into the accident scene if struck from behind. The chapter does not discuss distances to place the apparatus behind the accident scene or placement of additional warning devices. It does state to keep apparatus emergency lights on while at the incident scene but to turn them off en route when the apparatus enters the highway. The reason stated was that apparatus respond slower than the normal traffic flow and emergency light use might actually slow the fire unit's response. The chapter

recommends the that fire department consider parking another apparatus 150 to 200 feet behind the apparatus being used at highway incidents to act as an additional barrier between firefighters and the flow of traffic. The chapter also stresses that all members must use extreme caution when getting off apparatus to avoid being struck by passing traffic. The pump operator is also vulnerable to being hit by motorists if they step beyond the protection offered by the apparatus.

Leihbacker (1994) discussed the issue of being struck when in close proximity to the apparatus. He states that members might be at risk the most when near the apparatus. "Many firefighters have been struck by passing vehicles while returning to the engine to retrieve a tool, packing hose at the back step, or even stepping off the apparatus on arrival at the scene (Leihbacker, p. 22). He recommends that members be trained to look before stepping off the engine and to be especially cautious when working around it. On apparatus placement, he recommends stopping prior to the incident and parking diagonally with the pump panel away from the oncoming traffic. This will create a traffic-free zone that protects the pump operator and crewmembers as long as they operate within it.

The National Fire Protection Association Standard 1500 details health and safety issues related to the fire service. In Chapter 6-4, the standard discusses operating at incidents where fire personnel are exposed to vehicular traffic:

6-4.7 When members are operating at an emergency incident and their assignment places them in potential conflict with motor vehicle traffic, they shall wear a garment with florescent reflective material.

- 6-4.7.1 Apparatus shall be utilized as a shield from oncoming traffic wherever possible.
- 6-4.7.2 When acting as a shield, apparatus warning lights shall remain on, and fluorescent and reflective warning devices such as traffic cones, illuminated warning devices such as highway flares, or other appropriate warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to members operating at the incident (NFPA, 1992, pp. 1500-22).

These recommendations clearly state that the apparatus should be parked between the oncoming traffic and the emergency scene. The distances from the incident scene to place warning devices was not discussed in the Standard and is left up to the Incident Commander's discretion.

In Grant's (1975) book, *Vehicle Rescue*, the main focus is a training lesson on victim extrication and disentanglement of vehicles involved in a variety of accident situations. However, in Chapter Four he discusses the types of warning devices a well-equipped emergency vehicle should use in traffic control. These devices are:

- The vehicle's warning lights--the flashing, colored lights of a rescue, police, or fire vehicles-- may be used to good advantage during both day and night.
- Daytime warning devices, such as traffic warning cones and flags, are especially helpful if they are made with highly visible fluorescent materials.
- Nighttime warning devices most commonly used are red flares, which provide intense light in all weather conditions. Flashing lights, flashlights, hand lanterns, and traffic-control batons are other examples of nighttime warning devices.

• Personnel protection--traffic jackets, vests, capes, and bandoleers-- serve two purposes: they warn oncoming cars of hazards, and they offer protection to the individuals who wear them. These items should be made with a combination of fluorescent and reflective materials so that they can be used at night as well as during the daylight. (Grant pp. 110-111).

In the research material, these warning devices and apparatus equipment make up the primary tools found to establish a safe roadway incident scene.

Grant (1975) also discussed the distances for the placement of the farthest warning device in relation to the speed of the traffic. The speeds from 20 miles per hour to 70 miles per hour were used and distances given for the placement of the warning device. The distance recommended for 20 miles per hour was 70 feet and for 70 miles per hour the distance was 445 feet. The suggested distance at 60 miles per hour, 335 feet, is comparable to Dunn's (1992) recommendation of 350 feet for 60 miles per hour.

Another variable in warning devices is the distance that should be maintained between each warning device or marker. "Police maintain that flares, lights, cones, and the like should be placed from 10 to 30 feet apart, depending on conditions," (Grant, 1975, p. 114). The suggestion is to place the markers within 10 feet of each other when traffic flow is heavy or when weather conditions are bad. If the accident has happened on a long, straight road where visibility is good and traffic is light, a space of 20 to 30 feet between devices may be adequate. It may be necessary for the officer in charge to observe the traffic warning devices once they have been set up and determine if they are adequate for the conditions present on the roadway.

Grant also discussed three types of traffic control:

- Lane control. As the term implies, traffic is channeled past the accident zone over uninvolved lanes.
- Blockade. In some cases, wreckage or debris will cover all lanes of a roadway.
   There may be no alternative to blocking traffic from all directions until the lanes are cleared. This is especially true when an access occurs on a limited-access road.
- 3. Detour. In case of long delays, traffic can be shunted away from the accident zone if a suitable road is available. The selection of a detour should be made with care, especially when a roadway must be closed for an extended period of time (Grant, 1975, pp. 115-116).

In developing lane control techniques for various types of roads, (two, three, and fourlane divided and undivided highways) he suggests locations for the placement of warning devices and emergency vehicles. Similar techniques are also suggested for blockades and detours.

There is a need for the training of fire personnel in directing traffic at an accident scene. Police personnel primarily handle this function and people have been conditioned to look for them. Without distinctive markings, anyone other than a police officer may have difficulty gaining the attention of the drivers he wants to direct. A firefighter in turnout gear that uses incomprehensible signals without proper training may cause a motorist to just drive ahead and hope for the best. "When you are directing traffic at an accident scene, your most important job is to let motorists know what you want them to do (Grant, 1975, p. 123). He also suggests that when you direct traffic, you should look

the part. If you are going to be in charge of traffic flow, stand where you the motorist can see you and make the driver think you are there to direct traffic and that you are not merely trying to cross a busy road. The book includes various commands and the proper way to perform them—using two distinct motions. The first is to point your arm and finger and look straight at the driver you wish to give a direction and wait until he sees you and reacts. The second is to use your pointing hand and give the direction to stop, go, turn left, or right. The importance of proper demeanor and being in charge is the key (Grant).

Established in 1986, the Baystate Roads Program is a cooperative effort of the Federal Highway Administration, the Massachusetts Highway Department, and the University of Massachusetts. The purpose of this program is to provide information and training on transportation and related topics. Answers to problems of local agencies are accomplished by transferring new technologies in a useable format. The Baystate Roads Program has developed an innovative method to establish a work zone area for highway personnel that is adaptable to short term duration incidents involving police and fire departments. They recommend establishing a Traffic Control Zone that is divided into five separate components, each with a specific function to enhance safety at roadway incidents. The components are:

Advanced Warning Area: It is necessary for all traffic control zones because drivers need to know what to expect and then have enough time to alter their travel patters accordingly. The Advanced Warning Area will be set up and adjusted to traffic patterns and topography. This area begins at first indication to the motorist that normal road conditions do not exist ahead to the first cone or flare.

**Transition Area**: This zone is where traffic is channeled from normal highway lanes to a path around the incident scene. Cones and flares are used to create tapers that close lanes within the Transition Area.

**Buffer Space**: This zone is a section of clear roadway between the transition taper and the Work Area which can provide an extra margin of safety for emergency personnel and citizens.

Work Area: This zone is that portion of the road where personnel, vehicles and equipment must have adequate room to operate without interference from traffic. Use a secondary lookout to provide a warning to other workers focused on their activity.

**Termination Area**: In this zone, use a cone or flare taper to provide a short distance for traffic to clear the Work Area and return to normal conditions. Use sufficient cones and flares to ensure that traffic does not cut back into the Work Area and jeopardize workers and citizens (Baystate Roads Program, 1998).

The Texas Department of Transportation (TXDOT) operates a Courtesy Patrol that is made up of two-member teams that patrol in the Dallas area. Fire Department personnel can make a special call for the Courtesy Patrol through the department's dispatch center. The Courtesy Patrol also monitors the police channels and will often respond to roadway incidents without being called by the Police or Fire Department. TXDOT Courtesy Patrol vehicles have traffic control equipment and large, arrow boards that are very effective at redirecting equipment. In the TXDOT Standard Operating procedures, it is stressed several times to "Never, never turn your back on the traffic!

Walk backwards if you have to. Always try to have an escape route from the traffic. Somewhere to run!" (TXDOT, 1998, p. 5).

Steve Scarano is an EMT and a veteran of the Oceanside (California) Police
Department where he has served as the Sergeant in charge of Training. In the article,
"Caring for the Common Flare," he states that you should always face the traffic when
setting up a flare pattern and be ready to take evasive action if a motorist fails to yield to
the incident scene. To reduce the time spent in traffic replacing used flares, he states,
"To estimate the length of time-on-scene and daisy-chain or stack an appropriate number
of flares so that a lighted one will ignite another one just before it burns out" (Scarano,
1982, p. 35). He also suggests replacing the cap on the non-burning end of the flare so
that they won't roll with the curvature of the roadway or from the wind-wash of passing
cars or trucks. Additionally, Scarano feels that there is a tendency to use too few flares
and to place them too close to the emergency scene, which gives inadequate advance
warning to approaching drivers.

McCarthy (1998) emphasizes the need for a policy dealing with roadway incidents to ensure that proper precautions are taken. In discussing the need for operational procedures, he sites one of the toughest -- a policy to eliminate firefighters crossing the median of a divided highway. The rationale developed for the policy is to always have the apparatus to act as a blocker for approaching traffic, which will protect firefighters. McCarthy also states that red lights attract the attention of motorists drawing them toward the scene. He suggests that unnecessary red lights should be turned off once you have arrived on location.

#### **PROCEDURES**

#### **Research Methodology**

The first literature search was conducted in the LRC at the NFA from May 15, through May 31, 1998. There was a considerable amount of information related to driving safety for apparatus operators and traffic safety for the general public but the search revealed sparse information concerning procedures for traffic control or work zone safety at emergency incidents. A review of International Fire Service Training Association (IFSTA) manuals and various books concerning vehicle extrication in the Dallas Fire Department Training Library produced information concerning distances to place warning devices and driver reaction/braking times. The U.S. Governmental publications that outlined information on construction work zones concentrated on long term operations using barricades as channeling devices and discussed proper signage or flagging operations. These procedures were not as applicable to short term duration incidents typical of fire department operations on roadways.

A search of the Internet in June 1998, lead to Department of Transportation guidelines and information from The Baystate Roads Program at the University of Massachusetts, at Amherst, that outlined significant information concerning dividing a roadway incident into five Traffic Control Zones.

To determine if fire departments throughout the country were following written Standard Operating Procedures (SOP) or have developed lesson plans and train on roadway safety, a survey instrument was developed. The survey also asked what warning devices and special apparatus equipment their department used for these types of incidents. A copy of the survey and results are Appendix A and B.

# **Population of the Survey**

The survey was mailed to 105 individual fire departments in June 1998. The list was developed by compiling a list of 20 departments in the Dallas/Ft. Worth area. This was to develop a regional perspective on managing roadway incidents. In this sample the size of the department was not a consideration. The 1998 Metro Fire Department list was used to select 85 of the largest departments in the United States.

#### **Assumptions and Limitations**

The distribution of the survey was not designed to create an accurate random sample. The majority of the surveys were sent to larger departments because they have a greater number of high volume freeways as comparable to the city of Dallas. With the greater number of high volume freeways, the larger cities may be more inclined to have written procedures and conduct formal training.

The purpose of this applied research paper was not to identify all the safety hazards related to roadway incidents. Safety issues with fuels, air bags, extrication, etc., were purposely not covered. The road safety issues developed in the research paper concerned the hazard from approaching traffic, the establishment of a safe emergency scene, institutionalizing positive behaviors by personnel, and the identification of various traffic warning devices.

#### RESULTS

The first research question was answered from the literature review and concerned a universal way to establish a roadway incident scene that may be used at all types of incidents and roadways. The Baystate Roads Program developed the Five Parts of a Traffic Control Zone, which may be used on any type of roadway including intersection incidents. The parts of the Traffic Control Zone are: Advanced Warning Area, Transition Area, Buffer Area, Work Area, and Termination Area. Appendix D is the Traffic Control Zone as presented by Baystate Roads Program. Appendix F is an adaptation of the Traffic Control Zone that includes positioning of fire department apparatus and personnel locations as used in the Dallas Fire Department's Roadway Safety Lesson Plan.

The second research question was answered from the literature review and asked what are the safety procedures used by members that must be reinforced with training so that it becomes institutionalized. These actions, called Safe Crew Activities, begin with (1) looking before opening doors, (2) avoiding the use of doors on the traffic side of the vehicle, and (3) being cognizant that members are at the most risk in close proximity to the apparatus. These are followed by two more actions with (1) never turning your back to the traffic even if it is necessary to walk backwards and (2) always having a plan of where to seek refuge if a vehicle approaching you is failing to stop. Finally, these actions include the proper placement of apparatus as a shield to oncoming traffic.

The third question was also answered from the literature review and asked what are the best methods or guidelines for setting out cones and flares at a roadway incident. Two research sources concurred that at highway speeds, the cone and flare taper should extend from the shielding apparatus approximately 350 feet upstream into the traffic. With

weather conditions (e.g., fog, ice) or road layout (e.g., curves, hills) being a factor, the warning devices could be laid out as far as 1500 feet from the shielding apparatus. The distance between the cones or flares should be from 10 to 30 feet apart, depending on conditions. When traffic flow is heavy or when inclement weather conditions exist, place the markers within 10 feet of each other. The literature also suggested chaining the flares for the estimated length of time personnel plan to be on the scene. Stacking one flare on the end of another so that the next flare will light as the first one nears completion establishes this procedure.

The fourth research question was answered from the survey of fire departments and asked what equipment or warning devices are being used by fire departments other than cones and flares at roadway incidents. Reflective stripping on apparatus was the most common additional warning device and it was used by thirty-five departments (35). All responses stated the reflective stripping was per the NFPA guidelines. Fifteen (15) departments use reflective safety vests and their use was for both EMS personnel and for firefighters to be worn over turnout gear. Twelve (12) departments use illuminated arrow boards mounted on the rear of apparatus. Light wand flashlights are used as a warning device by six (6) departments. Telescoping lights were listed but primarily for scene illumination by six (6) departments. Eight (8) departments used strobe lights but responses stated that they were part of the apparatus standard emergency lighting.

The surveys were mailed to 105 fire departments with 58 percent returned over a six-week period. In answering the question, "Does your department have a policy, procedure, guideline, or safety bulletin dealing with traffic control and safety for fire personnel at the scene of roadway incidents?" 44% stated they did have a policy and 56%

stated they did not have a policy. Of the departments that stated they did not have a policy or procedure, 26% stated that one is planned or the department was currently working on a policy. To the question of, "Does your department conduct any training concerning roadway incidents?" 78% stated they do conduct training and 29% stated they did not train on roadway safety. Of the departments stating they did perform training on roadway incidents, the breakdown on the type of training is as follows:

- 13% had formal training lesson plans
- 18% stated the training was at the station level
- 18% stated the training was at the recruit training level
- 31% stated the training was for apparatus placement at the scene
- 13% stated the training was conducted by or with a police agency
- 6% stated it was in conjunction with other safety training

A training lesson plan entitled Roadway Incident Management and Safety was produced in Microsoft PowerPoint format for use in the department's In-Service Training Phase. The lesson plan incorporates material from the literature review, the fire department survey, and ideas suggested by firefighters and paramedics that received the training lesson as a preliminary review of the lesson plan. Development of the course was considered an on-going process where changes and improvements were made on input received. The training lesson is submitted as Appendix F. The following is an outline of the course:

# **Roadway Incident Management & Safety**

# **Dallas Fire Department**

## **Course Objectives**

- Roadway Incident Hazards
- Roadway management Tool
- Review Resources Available
- Apply Course Training
- Review Personal Experiences

## Why Roadway Safety?

- 1 in 4 Fire Calls Major Accidents or Vehicle Fires
- 1 in 5 EMS Calls Major Accidents
- High Risk Situations

## **Preplanning Before the Call**

- Morning Inventory
- Apparatus Check
- Review Street Closures
- Special Instructions

## **Approaching the Scene**

• Using the Shoulder

- Straddling the Lane
- Using One Lane
- Single Company
- Two Companies

# **Managing the Roadway Incident**

- Advanced Warning Area
- Transition Area 1<sup>st</sup> Steps
  - 1. Face the Traffic
  - 2. Start From Safety
  - 3. Slow Things down
  - 4. Use a Lookout
  - 5. Fox Holes
- Transition Area Design
  - 1. Establish the Taper
  - 2. Cones and Flares
  - 3. Spacing Cones and Flares
  - 4. How Many Devices
- Buffer Space
  - 1. Extra Margin of Safety
  - 2. Apparatus as Barrier
  - 3. Pumping Situations

- 4. MICU Arriving Before Engine
- 5. Traffic Control Devices
- Work Area
  - 1. Control Devices
  - 2. Activities
  - 3. Protecting Citizens
  - 4. Equipment and Apparatus
  - 5. Secondary Lookout
- Termination Area
  - 1. Control Devices
  - 2. Sufficient Length
  - 3. Spacing Devices
  - 4. Taper

# **Shutting it Down**

- Degree of Caution
- Warning Devices
- Warning Lights
- Departure

#### **DISCUSSION**

An issue developed in the literature concerned the training of personnel. In his article "Highway Incident Scene Safety," Rich Adams states that awareness, training and discipline in any on-road call can go a long way toward preventing the needless tragedy

of death and injury. The IFSTA Manual on Occupational Safety states that the driver/operator's ability to properly position apparatus requires training, practice, and ingenuity. Jonathan Smith, in his article, "Freeway Responses: A Second Accident Waiting To Happen," concludes by stating that in order to combat complacency and increase safety, you must plan ahead, train, and develop simulated freeway exercises. In many examples, the literature states that training, practice, and exercises are a key to increasing roadway safety. A review of the surveys revealed that 78% of the departments conducted training on road safety but that a large portion of the training was in recruit school, station level training, or as needed. Only 13% of the fire departments stated they have formal training lesson plans. Only 44% of departments stated that they have a policy, procedure, or guideline dealing with roadway safety. The conclusion is that the concern for proper training of personnel in roadway safety does not receive the same attention as other duties such as structural firefighting, EMS procedures, or hazardous materials. Training on roadway incident safety is inconsistent with estimates that in some departments, approximately 25% of all alarms are roadway incidents. Additionally, the percentage of returned departmental surveys was lower than expected with this type of sampling. This fact may be due to the low percentage of departments that have formal training lessons or a written policy or procedures for operating at roadway incidents.

In the literature review, IFTSA (1990) states to turn off emergency lights while responding on freeways. This practice is not considered beneficial in the city of Dallas due to the back up of traffic that occurs on freeways approaching the accident scene and departmental policy states that lights and sirens are to run continuously on emergency runs. McCarthy (1998) states red emergency lights should be turned off once the

apparatus has arrived on location. This is in conflict to NPFA 1500 that states to keep warning lights on when the apparatus is acting as a shield.

Eddinger (1998) in his Applied Research Paper for the National Fire Academy makes the point that the fire department is also responsible for protecting the public on the highways. His statement, "The perception also needs to change in the fire service so that the motoring public is protected first from the hazard that is caused by working a highway scene," underscores the idea that establishing a safe incident scene is also a responsibility to protect the public.

The Dallas Fire Department's In-Service Training Phase on roadway safety will include classroom training and several practical exercises. Simulations will include freeway, major thoroughfare and intersection incidents. Each exercise will include apparatus placement and the establishment of the five traffic zones with the proper distance for warning devices determined by the projected speed of the traffic on a particular roadway.

A section in the department's Roadway Incident Management and Safety lesson details preplanning before the call. Another section includes suggested methods to approach the scene such as using the shoulder of the road or straddling a lane. The material in these two sections was not derived from the literature review or the survey. This information was compiled from suggestions received from department members after preliminary reviews of the lesson plan.

The question of the types of warning devices such as cones, flares, and high visibility reflective garments or lighted arrow boards is a central issue to safe roadway

incidents. Several improvements are planned from information received in the surveys that will improve the department's capabilities in this area.

#### RECOMMENDATIONS

First, all fire service organizations should develop a training lesson on roadway safety and formally teach the lesson to all members. This should include practical exercises simulating various roadways and situations. Leaving the training to informal sessions taught at the station level or in association with other training will not ensure that all members will be trained in the same manner or to the same level.

Second, after training is completed and all suggestions and revisions to the training lesson concluded, the Dallas Fire Department will establish a SOP for inclusion in the Emergency Procedures Manual to handle incidents on roadways. This will include priorities such as setting up traffic control zones and apparatus placement. This SOP will validate that members are expected to perform in the manner in which they were trained.

Third, for departments that do not have enhanced warning devices or equipment such as reflective orange vests, lighted arrow boards vests, light-wand flashlights, or apparatus reflective stripping, they should evaluate this equipment for inclusion in their apparatus inventory. The Dallas Fire Department plans to make the following changes and evaluations:

• The department does not currently have lighted arrow boards on apparatus. Two engine companies will evaluate the arrow boards to determine if all apparatus should be equipped with these warning devices. Since arrow boards are best viewed directly from behind, the installation will allow directing the board at different angles to the

apparatus. The practice of placing an apparatus at 45-degree angle to the lanes of traffic makes it advisable to have the ability to reposition the arrow board facing the approaching traffic.

- The department plans to purchase safety vests for all engine, truck and ambulance positions. The safety vests will be florescent orange with reflective tape and large enough in size to don over turnout gear.
- The department is purchasing twelve light wand flashlights with orange cone covers for placement on various companies for evaluation.
- The department's newer apparatus have reflective horizontal stripping meeting NFPA
  guidelines. It is planned to retrofit all older engine and truck apparatus with reflective
  horizontal stripping as used on the newer models.

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# APPENDIX A

# FIRE DEPARTMENT SURVEY ON ROADWAY SAFETY

1.	Does your department have a policy, procedure, guideline, or safety bulletin dealing with traffic control and safety for fire personnel at the scene of roadway incidents?
2.	Does your department conduct any training concerning these incidents?
3.	What safety equipment does your department use at these emergencies?
4.	Are your apparatus equipped with any of the following special equipment for these emergencies?
	A. Telescoping lights
	B. Strobe Lights
	C. Reflective stripping on apparatus?

#### APPENDIX B

# **Survey Results**

Total number of surveys sent to fire departments 105 – completed and returned 61

1. Does your department have a policy, procedure, guideline, or safety bulletin dealing with traffic control and safety for fire personnel at the scene of roadway incidents?

Yes - 27 No - 34 (9 stated currently working on procedures)

2. Does your department conduct any training concerning these incidents?

Yes - 48 No - 18

Of the departments stating yes, the following types of training were identified:

Formal training lessons - 6
Station level - 9
Recruit training - 9
Apparatus placement - 15
Conducted with/by police agency - 6
In conjunction with safety lesson - 3

3. What safety equipment does your department use at these emergencies?

Safety Vests - 15 Cones - 25 Arrow Boards - 12 Light Wands Flashlights - 6 Flares - 53

4. Are your apparatus equipped with any of the following special equipment for these emergencies?

Telescoping Lights - 6 (primarily for lighting incident scene)
Strobe Lights - 8 (all stated as part of apparatus emergency lights)
Reflective Stripping on Apparatus - 35 (as per NFPA guidelines)

#### APPENDIX C

#### SAMPLE LETTER

Michael W. Price, Deputy Chief Dallas Fire Department Operations Division I, C Shift 6600 Trammel Dr. Dallas, Texas 75214 (214) 670-4784

June 15, 1998

Dear Chief:

The Dallas Fire Department is researching methods to increase the safety of our personnel while operating at roadway incidents. Our goal is to develop a Roadway Safety Training Program and possibly add new equipment to our apparatus. We are asking for assistance from the Metro Fire Chiefs by completing the enclosed survey and returning it in the self addressed, stamped envelope.

This information will also be included in a research paper for the Executive Fire Officer Program at the National Fire Academy. If you desire, I will send you the results of the survey. Taking the time to complete the survey and assisting with this project is appreciated.

Sincerely,

Michael W. Price

enclosure

#### APPENDIX D

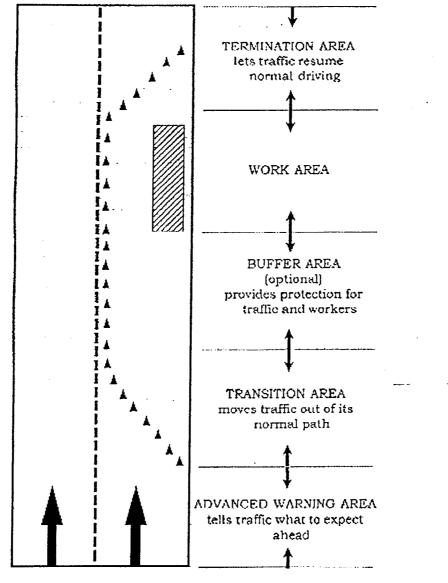


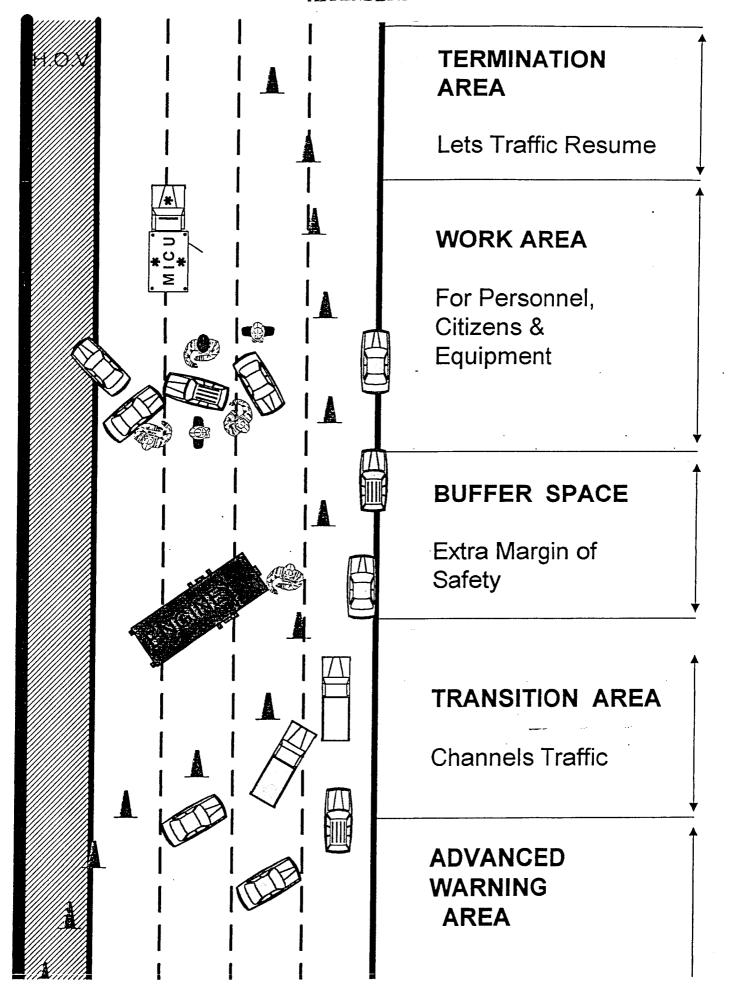


# Five Parts of a Traffic Control Zone

Excerpted from Work Zone Safety, produced by Institute for Transportation Research and Education

The traffic control zone is the distance between the first advance warning sign and the point beyond the work area where traffic is no longer affected. Below is a diagram showing the five parts of a traffic control zone.





#### APPENDIX F

Roadway
Incidents
Management & Safety

Dallas Fire Department

This lesson plan was developed to improve the safety of fire/EMS, police, public safety personnel, and citizens at roadway incidents. **Development** included contacting over 100 fire departments and many government agencies. We found very little in the way of fire department policy and procedures and no training resources.

Each time this lesson has been given, improvements have been made by using the ideas put forth by the firefighters and paramedics. With that experience, development of this course is considered an on-going process where changes and imprevements based on your input are expected.

The people that developed this course strongly believe that the application of the ideas taught here will save the lives of firefighters, paramedics and citizens.

# Why "Roadway Safety" Training?

- ♦ Respond On Dallas Roadways
- → Position On Dallas Roadways
- → 1 in 4 Fire Calls Major Accident
- → 1 in 5 EMS Calls Major Accident
- **⋆** High Risk Situations

Why Roadway Safety Training? Except for a few walk-ins where we don't transport, our business requires us to use roadways to deliver our services. Except for those incidents where we can park off the road...for example, parking lots, driveways, ... we'll position our apparatus on a roadway at the emergency scene.

25% of the fire and 20% of the EMS calls in Dallas are made to roadway incidents, that is, major accidents. Working a major accident places us at busy intersections and on freeways that present dangerous situations to our people and citizens. Once on the scene, we can easily become part of a second accident.

Our Defensive Driving Course teaches us about vision and hearing impaired drivers, fatigued and drug impaired drivers, stressed-out and inattentive drivers. The "Inattentive Driver" is the one driving 70, phone under the chin, cup of coffee and cigarette in one hand that's used to steer while the other hand is used to raise the volume on the radio to overcome the noise of the AC which is going full blast. We need to: "Prepare for the Unexpected". These impaired or inattentive drivers can show up anytime, day or night. They can make not only the freeway deadly, but they can turn a serene residential street into a nightmare.

If you still question the need for Roadway Safety training, you only have to look at what has happened to police officers, firefighters and paramedics here and in other cities. Anyone, with any time in the fire service, should recognize that working a roadway incident is dangerous. Today we are going to learn some ways to deal with these high risk situations.

Give examples of incidents that actually happened. Wagoner, Harkey, E22, E28.

## Preplanning

Before the Call

- **♦**Morning Inventory
- ◆Apparatus Check →
- **◆Review Street Closures**
- **♦**Special Instructions

Like firefighting, working roadway incidents begins with preparation and preplanning.

During morning inventory ensure that an adequate number of flares and/or cones are available on all apparatus for a protracted incident. Assure traffic vests available for each riding position.

Emergency, hazard, and headlight lenses are clean and operable.

Check for any road construction or street closures posted that would affect our access to roadway incidents.

Knowledge of streets, access ramps, road construction and closures along with the reported direction of travel should be used to determine the best route and approach to the incident.

In the event of incorrect information, such as direction of travel, be prepared to quickly identify alternate access ramps or streets. This kind of knowledge will help the Incident Commander manage the scene and resources.

**Special Instructions:** Officers should communicate their expectations to each company member who is not regularly assigned to their station on how the company handles roadway incidents. This should be done to minimize the time needed to set up the Traffic Control Zone and to minimize the time your people are exposed to traffic.

## Course Objectives

- Roadway Incident Hazards
- ◆ Roadway Management Tool
- \* Review Resources Available
- ◆ Apply Course Training
- Review Personal Experiences

This training will **examine the hazards** associated with the delivery of fire and EMS services to roadway incidents.

We will introduce a **roadway management tool** that provides a **framework for decision making**. Most of this training focuses on highway incidents rather than intersection incidents.

We will discuss available resources and how they can be used to manage your roadway incident.

Members will be given a chance to **demonstrate their** understanding of the material through simulated roadway incidents.

Last, we will allow the class to discuss your own personal experiences. Often times these personal experiences confirm the dangers of working roadway incidents and also validate the need for the safety measures recommended in this training lesson.

# Weather & Traffic Conditions

- ·Mist, Rain & Icing
- Visibility
- •Terrain
- Congestion & Speed
- ·Time of Day

Weather conditions and their affect on visibility, stopping distances, hydroplaning, glare, traction, etc. are factors to consider while en route and on the scene of a roadway incident.

The first mist or light rain on dry roads can create an oily film that is extremely slick; like ice.

Icy roads increase stopping distances and bridges create uncommon hazards.

The early morning or late afternoon sun can cause a blinding glare which can impair a driver's vision. Fog is extremely hazardous to drivers and to your emergency scene.

Rain increases "Stopping Distances". Heavy rain decreases visibility and causes flooding. Look for pools of water which could cause hydroplaning. If you see pooled water and think hydroplaning might be the cause of the major accident you are responding to, assume it can happen again and take measures to minimize risks while en route and at your scene.

Try to determine or anticipate conditions that caused the incident you're en route to. These same factors can easily contribute to another accident.

Traffic speed and congestion must be considered & constantly reevaluated with all other factors. Once set up, don't let your guard down and designate a person to monitor traffic flow.

## Approaching the Scene

- ♦Using the Shoulder
- ◆Straddling the Lane
- ◆Using one Lane
- →Two Companies
- +Stopping Distance

Depending on congestion and the speed of traffic, the following are some of the suggested ways fire and EMS companies may approach the scene.

When traffic is blocking all lanes, select the lane next to the shoulder so vehicles can move to the shoulder allowing you to pass. The shoulder of the road may be another option for your approach to the scene.

On freeways, straddling the apparatus over the lane stripe during the approach may allow drivers on either side to move over slightly, affording enough room to proceed. This is usually done in slow moving traffic.

Maintaining an approach in a single lane allows drivers far ahead of you to begin to move over to one side. Weaving back and forth confuses the drivers ahead of you as to which direction to move.

When two units are responding together, the lead apparatus will select the lane or path of travel based on a visual survey of the flow of traffic and the second unit will follow single file a safe distance behind.

As you near the incident, slow and allow enough space between your apparatus and the accident vehicles to provide a safe work area.

## First Arriving Company

- •IC & Safety Officer Roles
- ·Hazard Identification
- Size-Up Process
- •Positioning the Apparatus
- ·Traffic Control Devices
- •MICU Positioning

The officer or acting officer of the first arriving company will serve as the Incident Commander and "Safety Officer" until relieved. **Keeping traffic management as a priority is the challenge** to the first arriving officer along with anticipating needed firefighting, rescue or EMS actions and safety of personnel and victims.

Safety means **identifying hazards and taking measures to minimize them**, e.g., repositioning the apparatus and alerting incoming companies of the need to assist. If the situation warrants the need for additional resources call for assistance immediately.

When encountering unusual conditions, a general size-up of the situation should include appropriate information for incoming companies and Fire Dispatch, e.g..., if an alternate route is advisable, direction of travel, number of vehicles involved, possible number of injured, additional MICUs, rescue equipment and other resources as needed.

Drivers will position the apparatus **at an angle** that provides maximum protection of the work area, personnel and citizens.

Placing traffic control devices is an initial priority that normally is a function of the first arriving engine company.

MICUs should be positioned at a safe distance relative to the incident hazards, e.g..., leaking fuel. If arriving first, the MICU personnel should position the MICU to block traffic and protect the scene. Possible placement of traffic control devices will be discussed during the scenarios.

## Managing the Roadway Incident

#### **Traffic Control Zone**

- ◆Advanced Warning Area
- ◆Transition Area
- **◆Buffer Space**
- ♦Work Area
- ◆Termination Area

The Traffic Control Zone is an organized approach to defining, managing and controlling your roadway incident.

The **Traffic Control Zone concept** is based on flagging operations for road construction, but it certainly applies to our operations as well. Start thinking in these terms for each operation. Apply the concept to protect your people and citizens.

The Traffic Control Zone Components define different areas of the incident site. Like sectors on the fireground, these components should be used as management tools to provide a framework for decision making.

Keep in mind that it may not be necessary or even advisable to utilize all of the components of the Traffic Control Zone. Your experience and evaluation of the traffic conditions will dictate the need for the necessary components of this zone.

The Traffic Control Zone includes advanced warning area, a transition area to channel traffic, a buffer space for an extra margin of safety, a protected work area for the safety of rescue personnel and citizens and last an area to terminate the incident.

For the purposes of the course, when the term "Traffic Control Device" is used, it will most likely mean either a traffic cone or flare.

## Advanced Warning Area

- •Face the Traffic
- Topography
- •Resources & Response Time
- ·Work in Pairs
- •Minimum Distances

It is advantageous to work in pairs and face on-coming traffic when placing and retrieving warning devices.

When placing cones or flares, have a flashlight handy to scan or flicker the light toward on-coming traffic to get their attention, ....but, don't blind them.

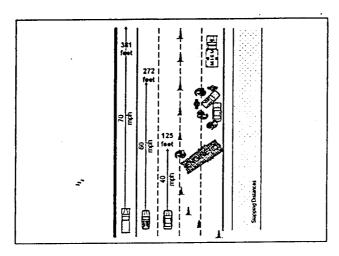
When possible, park at the crest of a hill or at the start of a curve in order to give approaching traffic ample Advanced Warning. Establish advanced traffic control devices on the opposite side of a hill or curve from the accident..

When the accident scene warrants better protection than is available, do not hesitate to call for additional trucks, engines, police or any other needed resource.

Response time should be considered when requesting additional units to block traffic; an engine may take less time than police unit.

Do not hesitate to shut down lanes of traffic when it is necessary to ensure the safety of your personnel and others at the emergency scene. You can always open up a lane and control or throttle traffic through at a reduced speed.

Usually, our emergency apparatus lighting and traffic control devices placed along the highway establish the Advanced Warning Area. On freeways, one authority recommends traffic control devices should be placed a minimum of 150 feet between the apparatus and on-coming traffic when conditions warrant. Another agency recommends 350 feet. It comes down to an issue of the Incident Commander's judgement that is based on the many factors discussed in this lesson. One of the important factors is the vehicle's total stopping distance.

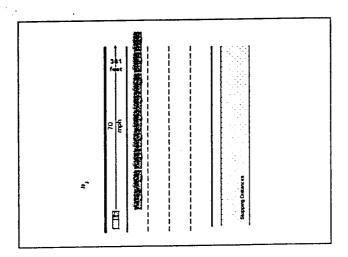


Three factors must be considered when determining a vehicle's total stopping distance:

- 1. **Perception Time:** The time it requires the driver to realize a danger exists on the roadway. This time is estimated at 3/4 of a second.
- 2. Reaction Time: The time needed by a driver to move a foot from the gas pedal to the brake. This interval is also estimated at 3/4 of a second.
- 3. Braking distance: The distance a vehicle will move after braking.

This slide shows the stopping distances for automobiles traveling at different speeds. These stopping distances include reaction time and braking distance, but not perception time.

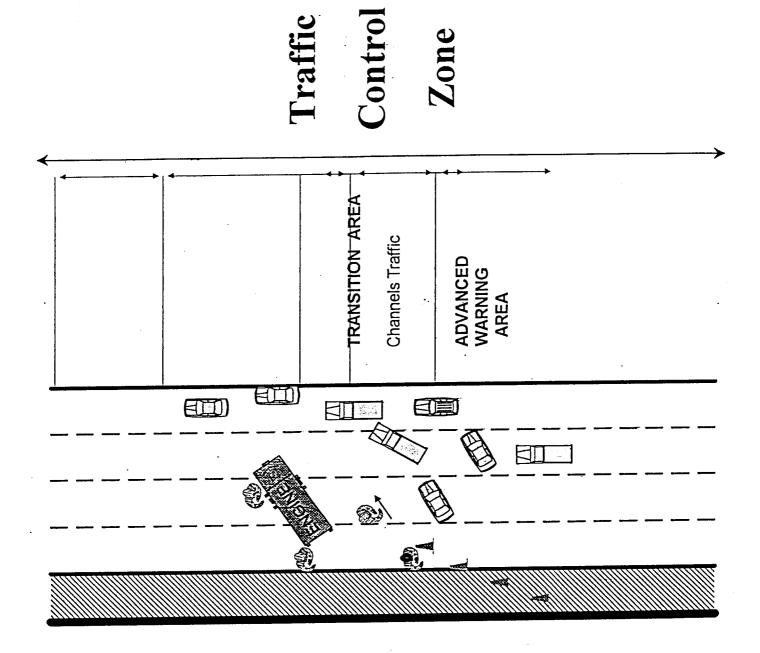
Perception time is obviously related to your decisions about when and where the traffic approaching your incident will recognize the need to slow or stop.



To visualize stopping distances, think in terms of apparatus length. An engine is approximately 30 feet in length.

In the above example, a car traveling at 70 mph is going to require a stopping distance of 381 feet or the equivalent space needed for 12 engines parked end to end.

Set up your Advanced Warning Area to give the motorist time to recognize what is ahead and then make the necessary adjustment in their speed and path of travel:



#### Transition Area

1st Steps

- ◆Face the traffic
- ◆Start from safety
- ◆Slow things down
- ♦Use a lookout
- **♦Fox Holes?**

Face the traffic and never turn your back on it. Keep the traffic in your field of vision. Wear a Safety Vest when setting out traffic control devices. Start from a position of safety, that is, from the shoulder or a lane already shut down. Be prepared to quickly return to this position of safety.

Before stepping out to place a cone or flare, stop the traffic by making sure you have vehicle driver's attention. Make eye contact if at all possible. Use your hands (waving, etc.) to get their attention. Once your are sure they are stopped and not going to proceed, begin setting up the Transition Area.

If you have to shut down more than one lane, get the first lane stopped and tell the lead driver not to move until you give him the ok. Only then move to shut down the next lane. Keep these lead vehicle drivers in your control.

Always be on the lookout for the unexpected, i.e., a driver cutting across your flare lines, a sudden change in the pace of traffic that compromises a Traffic Control Zone that was established for slow moving traffic. Be ready to adjust your Traffic Control Zone.

Working a roadway incident is dangerous, like a battle ground, but there are no fox holes to dive into. However, there are sometimes places you can quickly move to if that drunken driver shows up. For example, behind the Engine, MICU or Concrete Divider (make sure it isn't into an HOV lane).

HOV lane accidents may not offer a position of safety for the person setting out cone/flares. Consider stopping short of the accident, using the apparatus as a barrier, setting up the advanced warning and transition lines and then moving the apparatus closer to the accident vehicle to prevent exposing your people to traffic.

## Transition Area

- Design
- ◆Establish the Taper
- **♦**Cones Vs Flares
- ◆Spacing Cones & Flares
- ♦How Many Devices

Establish the Transition Area taper using flares or cones to channel traffic to other lanes or routes.

When comparing traffic cones to flares, there are some advantages of cones over flares. The cones are available in 18" and 28" heights. Motorist are less likely to run over cones because the cones have a high profile. If they do run over them, you'll probably hear the warning.

Another advantage is that cones don't require placing personnel back in dangerous situations such as resetting burned out flares.

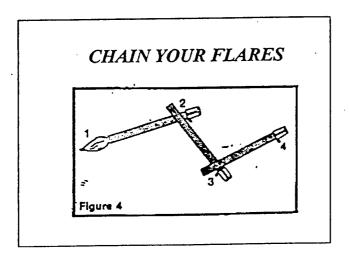
Cones are better suited to incidents with fuel spills as they do not present an ignition source.

Flares can be quickly set up and they take less storage space. A minimum of one full case of flares is recommended to be carried on all apparatus, including MICUs.

The stripes on highways are typically 20' in length and can be used to gauge distances. Remember to space your cones and flares to discourage traffic from cutting through them. A combination of flares and cones may prove effective.

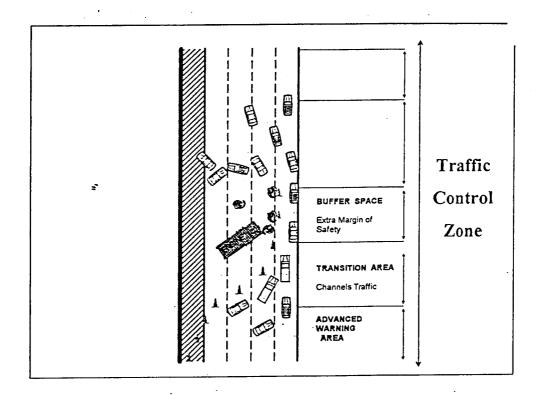
A minimum of 10 cones is normally needed to set up an effective Traffic Control Zone with its components. Police now carry 6 large cones in each squad car.

TIP: Lay the flare in front of the cone to illuminate the cone to on-coming traffic.



To reduce the number of times you have to reset your flare line or a single point, chain your unlit flares as shown so they will be lit successively.

Some of the flares have a plastic end-cap that will lessen the likelihood of the flare rolling away. If not, you can flatten the end of the flare to prevent roll away.



Buffer Space: This is a section of clear roadway between the transition taper and the Work Area which can provide an extra margin of safety for emergency personnel and citizens. In our operations we will position our apparatus in the Buffer Space to provide a physical barrier before the Work Area.

Many Departments recommend placing fire apparatus at a 45 degree angle to block additional lanes. Here is where your advanced lookouts can be positioned with the apparatus providing some protection.

## **Buffer Space**

- ◆Extra Margin of Safety
- ◆Apparatus as Barrier
- **♦**Pumping Situations
- ◆Safe Refuge

As discussed, the Buffer Space is that extra margin of safety. Traffic speed and congestion and other factors determine the size of the Buffer Space. Freeway speeds are going to require greater separation between the Transition Area and your Work Area.

Position the apparatus as a barrier to protect the Work Area. Park at an angle to close as many lanes as needed, ideally where the accident vehicles can be accessed from both sides. There should be sufficient Buffer Space between the apparatus and the Work Area to keep the apparatus from being propelled into the Work Area if it were hit by a vehicle.

Unless a hose line is required, angle the apparatus so it serves to channel traffic in the desired direction. If a hose line is required, protect the pump operator by positioning the apparatus with the pump panel away from the approaching traffic.

The apparatus barrier creates a safe refuge area for those not involved in the rescue effort and a place for your advanced lookout to retreat; usually this is the engine's driver.

## **Buffer Space**

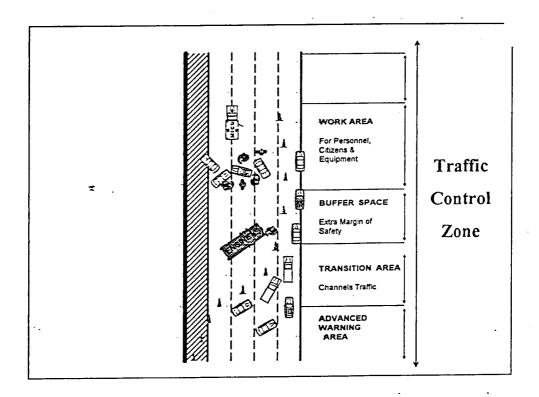
- ◆MICU Arriving before Engine
- **◆Traffic Control Devices**
- **♦Visible Barrier**
- **♦**Illumination

MICUs arriving prior to the engine or at an incident without an engine assigned will position as a barrier in the Buffer Space. The MICU should be parked at an angle to protect the scene and with the side door away from on-coming traffic. Equipment should be removed with extreme caution and always with an eye on traffic at all times.

Establish sufficient traffic control devices, cones or flares, to discourage drivers from cutting into the Buffer Space and entering the Work Area. If they see an opening, they may attempt to cross the Buffer Space and go through the Work Area.

Regardless of which one you use, cones or flares do not provide an "invisible force field". On the other hand, the apparatus is a "visible force field" and one that commands their attention. The apparatus is the best tool we have to protect our people,... use it!

Engine Drivers may be able to project their rear floodlights toward the roadway surface where warning devices will be placed. This will illuminate the personnel placing warning devices. Care should be taken to prevent shining the floodlights in the eyes of on-coming traffic.



Work Area: This is that portion of the road where personnel, vehicles and equipment must have adequate room to operate without interference from traffic. Position MICUs where patients can be safely loaded away from moving traffic lanes. Use a secondary lookout to provide a warning to other workers focused on their activity. Usually, this is the Incident Commander. Make sure there are sufficient traffic control devices to discourage traffic from driving into the Work Area.

#### Work Area

- **◆Traffic Control Devices**
- **★**Activities
- **◆Protecting Citizens**
- ◆Equipment and Apparatus
- ◆Secondary Lookout

[Use the Traffic Control Zone Layout as a reference as needed]

Continue with sufficient traffic control devices set in the Work Area.

Keep the Work Area activities out of and as far away from lanes of moving traffic as possible.

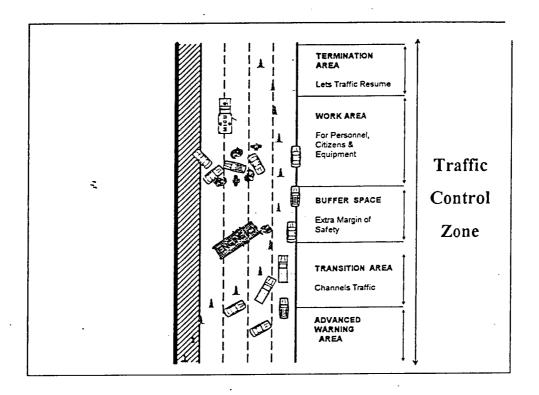
Remember to protect the citizens; you will be dealing with critically injured, walking injured, Good Samaritans as well as other emergency response personnel in the Work Area. Control their movements; tell them where you want them and, if available, use the police to control their movement.

If your Work Area is on the outside shoulder, you may be able to direct these people away from the roadway to a point of greater safety.

Position MICUs away from incident hazards and where patients can be safely loaded away from moving traffic.

From the Work Area, the Incident Commander will direct the operation and usually serve as a secondary lookout, continually assessing the overall situation and the safety of all concerned.

Keep in mind that members may be most at risk when they are in close proximity to their apparatus. Reportedly, many firefighters have been struck by passing vehicles while returning to the engine to retrieve a tool, reloading hose or even stepping off the apparatus on arrival and departure of the scene.



Termination Area: In the Termination Area we use a cone taper to provide a short distance for traffic to clear the work area and return to normal operation.

Use sufficient cones to discourage traffic from cutting back into the Work Area.

They will drive through cones and flares into the Work Area if given a chance, jeopardizing co-workers and citizens.

## Termination Area

- **◆Traffic Control Devices**
- **◆Sufficient Length**
- **◆**Taper

Continue with placement of sufficient cones and flares to create a Termination Area that moves traffic well past your Work Area.

This area may be used to park additional resources during the incident. Extend the Termination Area with cones and/or flares to prevent interference with these activities.

End the Termination Area with a taper that communicates to drivers the end of the Traffic Control Zone. Emergency apparatus drivers should be cautious when they exit the Termination Area. Some motorist may be focused on cutting off other drivers to get to the open lanes.

# Downgrading the Incident

- **♦**Degree of Caution
- **♦**Warning Devices
- **♦**Warning Lights
- **♦**Departure

Downgrading the incident should be managed with the same degree of caution exercised in your initial actions.

When retrieving warning devices, work in pairs, Maintain eye contact with on-coming traffic at all times.

All warning lights will remain on until the last apparatus safely departs.

The incident Commander will oversee the safe departure of the MICU, prior to the termination of the incident.

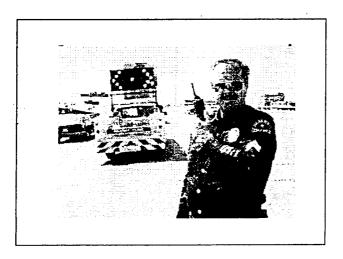
The fire company will maintain a presence to protect police, wrecker drivers and stranded citizens when they are exposed to hazardous traffic conditions.

Extreme caution should be utilized by all apparatus departing from the incident.

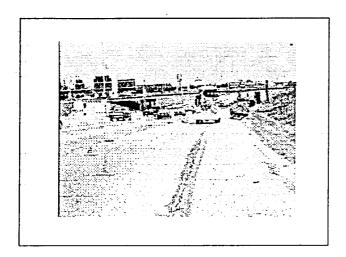
Never let your guard down when downgrading the incident.

## TXDOT Courtesy Patrol

A Valuable Resource

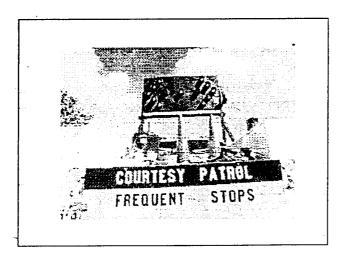


They monitor the police channels and often will respond to your roadway incident without being called.



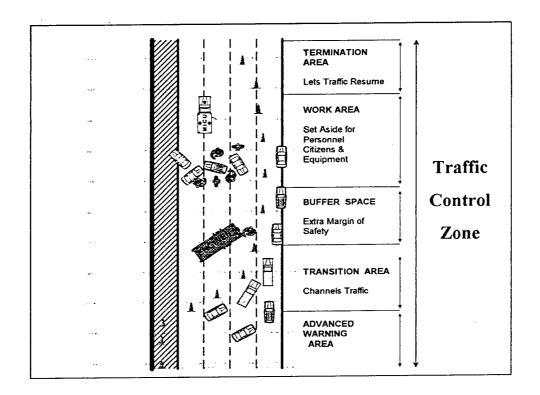
You can make a special call for the TXDOT Courtesy Patrol through Fire Dispatch. Fire dispatch will contact the TXDOT dispatcher who will then send the closest available Courtesy Patrol to your location using a GPS locator system. Always ask for an ETA when requesting the Courtesy Patrol. An ETA will be provided by TXDOT and then relayed so you can decide if other resources can provide a faster response to your location.

They are great at diverting traffic around your incident.



They have traffic control equipment and their pickup trucks are equipped with Arrow Boards that are very effective at redirecting traffic.

They are a great resource and they don't mind coming out to your incident.

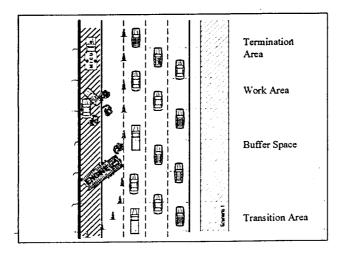


**Traffic Control Zone Components** 

In this situation, you have the freeway shut down to one lane. Your lookouts need to be alert to drivers trying to cut across your flare line or line of cones.

One of the most important aspect of emergency traffic control is to ensure that the vehicle operators know exactly what you want them to do.

Does your flare line or cone placement clearly communicate this message?



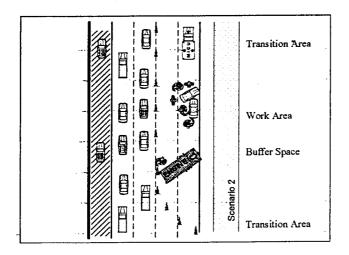
In this situation traffic is channeled to three lanes.

Realistically, you may not establish an advanced warning area with flares or cones, but utilize your apparatus' emergency warning lights and the presence of your apparatus as your Advanced Warning.

This may be adequate if visibility is good and your apparatus is in a clear line of sight to the approaching traffic. Speed of the traffic and the degree of congestion will influence how you set up the Advanced Warning Area. Traffic traveling at 70 mph instead of 30-40 mph is much more threatening to your operation and personnel if motorist lose control of their vehicles. Think in terms of potential secondary accidents threatening your operation.

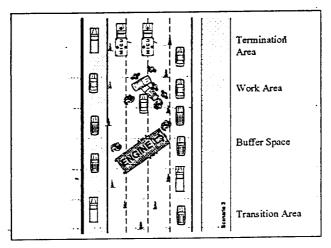
Your incident may initially be set up for slow moving traffic, but later may provide an inadequate Advanced Warning if motorist start traveling at greater speeds. Try to anticipate possible changes in traffic speed and congestion that require adjusting your Advanced Warning Area. Traffic control measures in your Transition Area may prove efficient and result in less congestion. With less congestion, you might also see traffic moving faster around your incident ....speeds that may require adjusting your Advanced Warning or deliberately throttling down the traffic to control traffic speed at your incident.

Traffic should always be considered unpredictable, especially where an emergency incident is involved.



One way to set up the transition area in fast and aggressive traffic where drivers seem unwilling to slow or yield, is to get the next semi rig to pull across the lanes and stop long enough for you to set your Transition Area Taper. The semi will provide a safety barrier for the member setting out traffic control devices.

Those that have done this, report that most truck drivers appear willing to accommodate your efforts to get control of the situation. Perhaps you will see an opportunity to do this at your next incident.



Here we have a center-of-the-road accident where traffic is allowed to flow on both sides of the incident.

Lookouts are stationed on both sides.

MICUs are parked out of traffic where patients can be loaded safely.

The Termination Area is not fully shown here, but it should extend beyond where the MIÇUs are positioned.

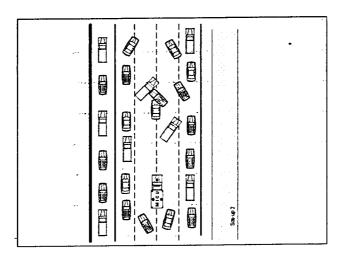
Most engines don't carry this many cones, so a combination of cones and flares may be necessary.

Is this a safe operation?

Is this a safe operation with traffic backed up for a quarter of a mile and moving at 35 mph?

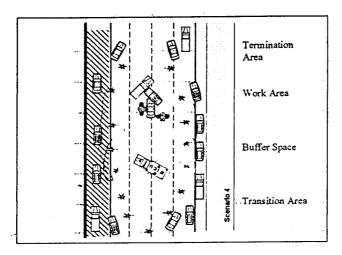
Is this a safe operation with traffic moving freely through at 60 mph? Are fast moving cars jockeying at the last moment to get into one of the two clear lanes of traffic?

Changes in traffic speed and congestion may require adjustments in how you manage your scene and if you need to call for assistance.

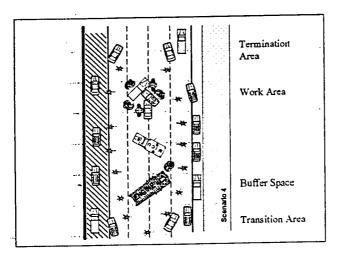


Remember your approach to the incident may provide an opportunity to control the flow of traffic.

Here the MICU slows before reaching the accident vehicles by forcing traffic to channel away from the accident vehicles. They can stop short and use the MICU as an initial barrier that establishes a buffer area.



MICU crews arriving first to center-of-the-road accidents must be careful setting up the situation. Remember our first priority is personnel safety. In this situation, call for assistance if it is not already on the way.

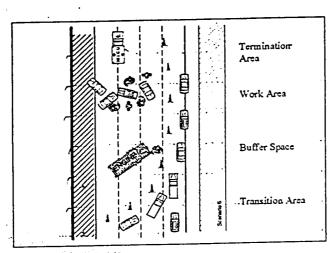


If using flares in this situation, consider **chaining** the flares so you minimize the need to reset your flare line.

Traffic congestion and speed can make shutting down this incident very dangerous.

Congested and slow moving traffic can pose less of a threat than light and fast moving traffic.

Late night or early morning may prove to be especially dangerous when traffic is light because you don't have the ability to throttle down the traffic by maintaining some back up or congestion around the incident. You might see drivers making some high speed challenges for those clear lanes around the accident with the result of a secondary accident.



A law was recently enacted here in Texas that doubles the amount of a fine for traffic violations that occur at roadway construction sites. By now you have probably seen the signs stating traffic fines are double.

The lesson here is that even with a properly established Traffic Control Zone with all of its components in place, motorist are not heeding the warning signs.